THE PREVALENCE OF ILL HEALTH[1]

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Nearly 350 years ago, Christopher Marlowe had *Faustus,* in his soliloquy upon the choice of a profession, weigh the success of medicine in these words:

> "*Summum bonum medicinae sanitas.*
> The end of physic is our body's health.
> Why, Faustus, hast thou not attained that end?
> Are not thy bills hung up as monuments, whereby
> Whole cities have escap'd the plague, and
> Thousand desperate maladies been cured?"

So to-day, without the pessimism or the sophistry, I hope, of the master of the black art and surely without his motives, we may apply his test in measuring the success of preventive medicine. It is true that plagues and pestilences such as those which flourished in Marlowe's and Shakespeare's day have been ban-

[1] From the Office of Statistical Investigations, U. S. Public Health Service.

ished from the modern part of the world at least; that many more maladies have yielded to modern treatment; that millions of sick have been relieved from their suffering and that millions more have escaped disease and have lived lengthened lives. These achievements are monuments indeed to the discoveries, the science, and the unselfish art of medicine. Yet the goal of preventive medicine, which is a healthy people, is far from being reached and the *curative* skill of a great army of physicians is still needed. Why have we not attained that end?

In response to the invitation with which you have honored me I can not presume to attempt an answer to so comprehensive a question. You, better than any others, know the prevalence of disease in our day and generation, and I shall not be able to add to that intimate knowledge you have gained by daily experience with the sick and the impaired and by researches out of which you have made so many valuable contributions to the science and practice of medicine. But perhaps as a collector and analyst of facts in the mass, who has devoted some years to an attempt to delineate the problems of health in statistical terms, I can be of some service in summarizing, in crude outline, what we know about the prevalence of disease in our population. Surely it will do us no harm—indeed, it is necessary to the proper development of effective prevention of ill health—for us to have a glimpse now and then of the situation as a whole.

Before attempting to do this, however, I suppose we should try to define what we mean by ill health and to select the scale by which we are to measure it.

Ill Health a Relative Term

What is ill health? To say that ill health is a deviation from "normal" health is merely to indulge in one of those impressive but unsatisfying dictionary definitions. For, how much of morbidity itself is "normal" reaction, in the process of natural adjustment to environment, as Haldane suggests? How many impairments and conditions, commonly denoted as "disease," are merely signs of "normal" wearing out of human clocks, some of whom, to use Pearl's metaphor, are set by heredity to run a longer time than others? When is death itself "normal"—at

three score years and ten, or at the century mark, or at 200 years, or even at Methuselah's reputed age? How long a time, in fact, did Methuselah take to *die* in? I am afraid that so purely philosophical a consideration will lead to nothing more than obfuscation. So let us concede at the outset that health or ill health is a relative thing, measurable at present only by some assumed standard with which we are all more or less familiar, even if not in strict agreement upon. In fact, no criterion can be very exact for several reasons, one of which is that physicians, upon whom we depend for most of our data, do not agree invariably in their diagnoses. Yet the statistical picture, if we do not try to fill in too much detail, will not be without interest and considerable accuracy.

Indices of Ill Health

The indices of ill health at present available to us for statistical purposes are:

(1) Death rates, specific for sex, age and cause, or some life table expression such as the expectancy of life or the probability of dying at a given age;
(2) Morbidity rates among persons of given sex and age based either upon the frequency of sickness from a specific cause during a given period of time, or upon the prevalence of illness from such a cause at an instant in time;
(3) Physical impairment rates among persons of given sex and age for a specific type of impairment as ascertained by an examination or by repeated observations.

It is understood, of course, that unless a group of persons is selected for some specific purpose, the group for which we desire these indices of ill health should be a fair sample of the population.

The inadequacy of death rates as indices of ill health.—The use of death rates as indices of the prevalence of disease has been so universal that the problems and aims of public health are set forth almost entirely in lethal terms whenever statistics are used. This is unfortunate. One effect of a prolonged dependence upon mortality statistics has been to vitiate in some degree the mortality statistics themselves. For, by reason of a laudable

desire to ascertain the prevalence of tuberculosis or cancer, for example, vital statisticians have classified deaths under that title even when the attending physician reports it on the death certificate as merely contributory to the actual cause as he observed it. More deplorable than this statistical practice is the gradual education of the physician himself into this procedure. Another effect of too great emphasis upon mortality statistics has been to foster a fallacious premise for public health work, namely, that a low death rate necessarily indicates the absence of ill health. Obviously it does not. We know that, on the contrary, an exceedingly unhealthful region may exhibit a mortality which is not extremely high, as, for example, a heavily infested hookworm locality, or a section abounding in malaria. Pellagra may be widely prevalent in a community without affecting materially its general death rate or even causing a large number of deaths from the disease itself. Instances of the same sort could be multiplied. Much ill health that is manifested in symptoms, in discomfort, in lessened vigor and efficiency, even in illness and suffering, is not reflected in the death rate, except for certain diseases, for any practicable purpose in preventive work.

What really matters more to the sanitarian and the physician, therefore, in their scientific searching for causes and conditions and in their preventive work, is not deaths but *ill health.* Of far greater importance than mortality rates and life table expressions is a view of the health situation depicted by *physical impairments* as revealed by competent medical examination, and by morbid conditions as ascertained by adequate records of *sickness.* If such a view were permitted, it will hardly be denied that the resulting change in perspective would lead us to modify considerably our schemes for research and our program of effort.

I shall not, therefore, use mortality rates in this brief discussion on the prevalence of ill health except in an incidental way.

The kind of indices needed.—Furthermore, it must be obvious from clinical experience as well as from considerations of a practical nature that the full extent of ill health and its kinds can not be ascertained by any one method. Properly conducted physical examinations, supplemented by the necessary laboratory findings, yield certain indispensable indications of the existence and the net results of various diseases and conditions; but they

will not tell the whole story. A carefully obtained history of prior attacks of disease, symptoms, and exposure to certain possibly relevant conditions for each individual will add to the picture. Of undoubted importance is a period of observation during which the reactions of the individual under ordinary as well as under extraordinary circumstances are recorded; this record may be of the occurrence of various symptoms and of the extent to which the subject is affected—whether only slightly ill, or more or less continuously "below par," or unable to engage in his usual activities, or disabled for long periods, or dying. The detail and accuracy with which these observations are made depend, naturally, upon the means employed. Unfortunately no such combination of records is yet available for any considerable sample of our population, and for the present we must be content with observations made according to one method for one sample and records obtained by another method for another.

What Physical and Medical Examinations Show

Let us consider first the findings from physical examinations. Such records are numerous but unfortunately they are not comparable as to terminology or as to the methods employed. I shall refer to but three series of records which probably approximate more closely than other series what the medical findings would be for samples of the general population.

One series is the reported defects in about two and one-half million men registered and examined in pursuance of the selective service act in 1917–1918. All of us are more or less aware of the unavoidable weaknesses of these findings, due principally to the fact that they were not made primarily for a complete appraisal of the health of these men. The gross results, however, are illuminating. Another sample is that afforded by the examinations made by the Life Extension Institute as recently reported by Dublin, Fisk and Kopf, covering nearly 17,000 male policy holders of the Metropolitan Life Insurance Company. (See Table 1.) A third sample consists of about 10,000 employees of industrial establishments who were given physical examinations by medical officers of the United States Public Health Service in the course of its studies in industrial hygiene, as reported by Britten and Thompson. (See Table 2.)

TABLE 1

NUMBER OF CERTAIN PHYSICAL IMPAIRMENTS PER 1,000 MEN EXAMINED AT DIFFERENT AGES*

16,662 white males insured in the Metropolitan Life Insurance Company, Ordinary Department, 1921

Impairment	All ages	Age group				
		Under 25	25–34	35–44	45–54	55 and over
Number of persons in specified age group	16,662	861	5,885	5,799	3,023	1,094
Nose and throat:						
Enlarged septic or buried tonsils	262	340	328	256	171	130
Hypertrophic rhinitis, enlarged turbinates	148	190	169	151	107	101
Teeth and root infection:						
Pyorrhea, definite	48	12	27	57	71	74
Heart and pulse:						
Mitral murmur, stenosis	2	2	2	1	2	4
Mitral murmur, regurgitation	7	3	7	5	9	15
Aortic murmur, stenosis	1	–	1	1	–	2
Aortic murmur, regurgitation	–	–	–	–	1	1
Blood-vessels and blood pressure:						
Marked arterial thickening	6	1	4	3	7	37
Blood pressure, 60 or more above average	3	1	–	1	7	23
Stomach; abdominal organs:						
Hemorrhoids	123	44	93	128	177	163
Inguinal hernia, no truss	22	14	14	22	31	48
Inguinal hernia, truss worn	29	2	14	26	51	82
Urinary findings:						
Albumin, marked amount	8	14	7	7	9	12
Sugar, marked amount (quantitative)	5	1	3	3	10	11
Casts, granular or epithelial	4	3	–	5	7	8
Casts, hyaline	41	42	30	40	53	75
Indican	39	31	40	40	37	44

* Data from Dublin, Fisk and Kopf: "Physical Defects as Revealed by Periodic Health Examinations."

TABLE 2

NUMBER OF DEFECTS AND DISEASES PER 1,000 EMPLOYES OF VARIOUS INDUSTRIAL ESTABLISHMENTS AT DIFFERENT AGES*
10,062 White Males Examined by Medical Officers of the United States Public Health Service, 1914–1924.

Impairment	All ages	Age group									
		Under 20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60 and over
Number of persons	10,062	494	1,405	1,845	1,739	1,561	1,127	813	510	305	263
Digestive:											
Constipation	158	109	118	133	186	153	189	183	165	170	228
Other digestive[1]	81	73	59	69	84	80	102	87	110	79	87
Eye and ear:											
Inflamed eyes	120	71	81	106	105	138	146	175	165	138	129
Impaired hearing	212	81	104	131	158	208	260	326	365	443	502
Other ear defects	55	51	56	62	55	57	46	53	51	56	49
Heart:											
Organic heart	37	18	21	32	35	26	52	45	61	65	87
Enlarged heart	39	30	34	30	29	31	51	50	65	62	110
Irregular heart	20	34	15	18	15	19	19	17	18	36	53
Other circulatory:											
Arteriosclerosis—											
Marked	32	4	8	14	19	27	49	49	75	105	167
Slight	67	12	36	48	49	70	77	99	141	148	198
Hernia, varicose veins, etc:											
Hernia	99	53	67	89	90	108	121	127	127	128	182
Enlarged rings	26	14	27	34	26	35	18	20	18	23	8
Varicocele	53	40	46	50	52	60	48	81	43	46	49
Varicose veins	59	4	21	27	55	78	81	111	102	128	99
Flat feet—											
With symptoms	16	6	15	18	25	21	17	2	12	13	4
Without symptoms	161	103	198	184	187	169	147	122	102	92	76

TABLE 2—(*Continued*)

Impairment	All ages	Age group									
		Under 20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60 and over
Number of persons	10,062	494	1,405	1,845	1,739	1,561	1,127	813	510	305	263
Nose and throat:											
Chronic diseases of nasal pharynx	428	330	491	493	458	440	381	367	331	302	266
Enlarged tonsils	169	222	218	219	171	174	115	116	98	79	38
Diseased tonsils	103	85	95	114	114	106	110	106	75	79	49
Respiratory:											
Tuberculosis	25	10	16	23	26	37	21	33	29	13	23
Bronchitis (acute and chronic)	45	45	26	39	37	49	60	52	73	59	49
Emphysema	11	–	2	5	5	12	15	27	31	36	27
Skin	81	87	111	95	77	72	79	68	51	36	34
Teeth:											
Pyorrhea	296	83	177	231	291	356	392	415	400	387	388
Defective teeth	305	215	182	199	240	352	390	459	502	544	536
Miscellaneous:											
Hemorrhoids	104	4	45	75	106	119	142	170	149	190	148
Venereal diseases	9	10	12	14	9	4	6	6	10	7	8

* Data from Britten and Thompson: "Health Study of 10,000 Male Industrial Workers."

[1] Includes diarrhea.

Now, although the findings of these three series of physical examinations are not as comparable as we would wish and although they in all probability are a *minimal* statement of the actual conditions, they afford facts which are of grave import to sanitarians and physicians. I shall try to summarize them in a single sentence: A large proportion—the exact percentage, whether it be ten or thirty, does not matter just now—of our adult population at ages when they ought to be at their fullest vigor have serious impairments of the respiratory, circulatory, digestive and eliminatory systems, and are actually affected with diseased conditions, which result sooner or later in morbid states, with varying degrees of inefficiency, suffering and fatality.

What Sickness Records Show

The most satisfactory measure of ill health that we now have is morbidity, and it is to some new statistics of sickness that I wish to invite your attention for the remainder of my remarks.

You are familiar, of course, with the extensive sickness surveys made by Dr. Dublin and his associates which showed that the *prevalence rate* of sickness in a large sample of our population is about 2 per cent. By this prevalence rate we mean that 2 per cent. of the population was found to be actually sick at a given instant in time and, since the observations were made in urban as well as rural areas, upon persons of both sexes and all ages, and at different seasons of the year, may be used as the basis for an estimate that not less than 2,300,000 persons, probably more, of our population are constantly sick.

Another way of measuring the amount of ill health is by the frequency, or the *incidence rate,* of sickness during a given period of time. Considerable European as well as American experience has been accumulated showing the number of illnesses of various durations and degrees of severity. Since most of this experience relates to special groups, I shall not attempt to summarize it here. Instead, I venture to present the gross results of a morbidity study covering a general population group which was under observation for over two years. So far as my associates and I are aware, this is the most extensive record of this kind yet made.

The Hagerstown Morbidity Study

This study, which has come to be known as the "Hagerstown morbidity study," included 16,517 "years of observation," or an equivalent of a population of 7,079 persons observed continuously for 28 months. Only white persons, practically all of whom were native born, were included. No predominant industry is situated in this city of 30,000 population, and it may be said to be typical of many other cities of its size in the eastern section of the United States. The principal objective of this study was a record of illnesses that were experienced by a population group composed of persons of all ages and both sexes, and in no remarkable respect unusual. The records of "illness" obtained were of illnesses as reported to experienced field investigators who visited each family every 6 to 8 weeks, the reports being made by the household informant (usually the wife) either as experienced by herself or as she observed them in her family; the definition of the term thus can not be refined any further than the common understanding of the word, although the diagnoses in practically all illnesses having medical attention were confirmed by the attending physicians. Since *attacks* rather than ill health were recorded, the record of persons affected with chronic conditions is complete to the extent to which these persons suffered ill effects of these conditions *during the period* of observation.

The results of the study indicated that we had secured a fairly accurate record of real illnesses. As a matter of fact, less than 5 per cent. of the illnesses of exactly stated durations recorded were one day or less in duration. Nearly 80 per cent. were three days or longer, and 60 per cent. were eight days or longer in duration. Approximately 40 per cent. were not only disabling but caused confinement to bed. It is evident, therefore, that in the main the illnesses recorded were more than trivial in their character, in spite of the fact that in some instances mere symptoms were given as diagnoses. The incidence of acute attacks of specific and generally recognizable diseases, was, we feel, recorded with a satisfactory degree of completeness. On the other hand, the incidence of mild attacks, as for example, of coryza, was quite incomplete as judged by records of minor

respiratory attacks obtained later upon other population groups.

The gross illness rate.—A total of 17,847 illnesses were recorded, which gave an annual rate for the 28 months period of 1080.5 per 1,000 population, or about one illness per person per year. The death rate was 9.3 per 1,000. The annual incidence rate for illnesses was 116 times the annual death rate in the same population; it was 107 times the annual death rate of the total white resident population of Hagerstown. If this ratio of illnesses to deaths is anywhere near that which would be found for the general population, the guess may be ventured that upon a rate of 1.0805 annual illnesses lasting three days or longer per person, the illnesses in 1922–23 among the population of the United States would have approximated the impressive total of 120 millions per year. If one takes the death rate in the mortality registration area as a basis, which was about 12.05 per 1,000 in 1922–23, and the ratio of 107 illnesses per death, the still more imposing total of over 140 million illnesses per year would be indicated. One hesitates to stretch the validity of a study of a small sample, however carefully made, by using it as the basis of broad estimates for larger populations. If it pleases any one to play with figures in this manner, probably these estimates are not so far off.

The results of such a study can not be presented in detail in a single paper, but I shall select three phases that may be of especial interest to you, namely: (1) The variation in the morbidity rate according to age; (2) the general nature of the conditions recorded; and (3) the extent to which sickness in this sample population received medical and hospital care.

The illness rate at different ages.—When we consider the frequency of illness among persons of different ages, as is shown in Table 3 and Fig. 1, two rather striking indications were given by this series of observations. First, the extraordinarily high incidence of sickness shown in early childhood was a rather surprising result. Illness was far more frequent under 10 years of age than at any other period of life. Second, the interesting suggestion was afforded that the average individual is most free from illness in the age period 15–24 years. Thereafter, sickness

TABLE 3

INCIDENCE OF ILLNESS FROM ALL CAUSES AMONG A GROUP OF WHITE PERSONS OBSERVED IN HAGERSTOWN, MD., DECEMBER 1, 1921–MARCH 31, 1924

Age, in years	Annual rate per 1,000	Number of illnesses
0– 4	1,588	2,822
5– 9	1,554	3,270
10–14	1,187	2,034
15–19	764	1,062
20–24	712	809
25–29	825	1,020
30–34	920	1,136
35–44	924	2,006
45–54	1,009	1,691
55–64	959	863
65 and over	1,080	875

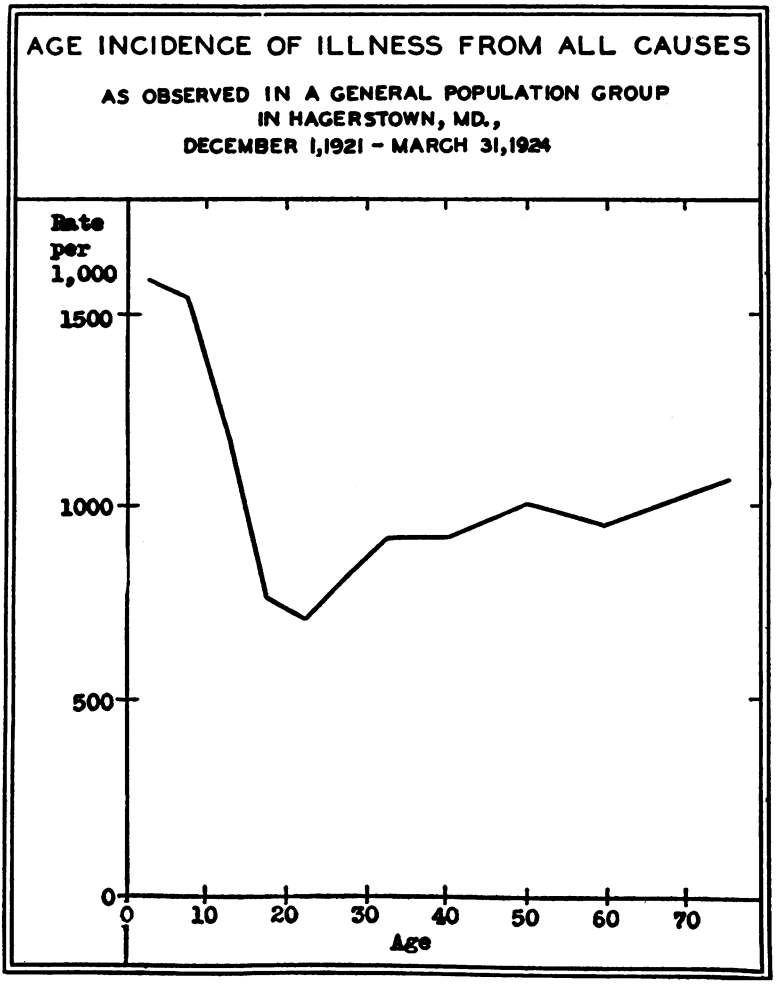
becomes more frequent as age advances[2] and, it may be added, upon the basis of other studies as well as our own, sickness becomes more severe and more frequently fatal.

The question naturally suggests itself: Just what does this variation according to age in the morbidity rate mean? Does it indicate that a greater proportion of the population in one age group was sick than in another, or does it signify that the higher incidence rate was due to the greater frequency of sickness in a sickly moiety of the group? Or do both conditions prevail?

"Sickly" and "well" persons in different age groups.—A more satisfactory answer could be given had we the time to consider the details of the causes and conditions of the illnesses recorded, but a broad interpretation of one meaning of the morbidity curve is suggested by the distribution of the individuals within each age group according to frequency of illness during the period of observation. Selecting those individuals who were under observation for 26 months or longer, excluding children under two years of age, and classifying them into two groups—(*a*) those suffering no illness during the entire 26 months' period, and (*b*)

[2] Industrial sickness experience sometimes shows a declining frequency as age advances in the age group 20–44, which apparently is due to an elimination of sickly individuals and to an adjustment to industrial environment on the part of those who remain at work.

FIG. 1


AGE INCIDENCE OF ILLNESS FROM ALL CAUSES
AS OBSERVED IN A GENERAL POPULATION GROUP
IN HAGERSTOWN, MD.,
DECEMBER 1,1921 - MARCH 31,1924
Rate per 1,000
1500
1000
500
0
0
10
20
30
40
50
60
70
Age

those ill four or more times, two age curves appear in sharp contrast—the "curve of good health," as indicated by the proportion of persons free from illness, which is lowest in childhood, sharply rising through adolescence to its maximum in the early adult years, and thereafter gradually declining until the end of the life span, and the "curve of ill health," as indicated by the proportion of persons suffering frequent illness, which is almost the obverse. (Table 4, Fig. 2.)

TABLE 4

PROPORTION OF WHITE INDIVIDUALS IN HAGERSTOWN, MD., OBSERVED FOR 26–28 MONTHS, WHO WERE FREE FROM ILLNESS OR WHO SUFFERED FREQUENT ATTACKS, BY AGE GROUPS

Age, in years	Per cent. of total in each age group	
	Not ill	Ill 4 or more times
2– 4	4.7	44.4
5– 9	7.4	45.5
10–14	14.8	27.1
15–19	25.7	14.3
20–24	29.6	10.5
25–29	23.9	16.4
30–34	22.8	18.4
35–44	25.0	21.2
45–54	21.5	22.6
55–64	21.2	21.9
65+	15.7	20.0

Resistance to death at different ages.—The further query suggests itself: At what age is the individual least able to withstand disease after he has been attacked? One way to measure this is to compare the number of illnesses per death at different ages. (Table 5, Fig. 3). This shows that the greatest resistance to death is in childhood, the age period 5–14; his lowest resistance is in infancy and early childhood (0–4 years), and in middle and old age. Ability to survive illness thus varies markedly from resistance to illness at different ages, particularly in childhood (5–14), when the average individual suffers from illness frequently but has a relatively small chance of dying, and in the

FIG. 2

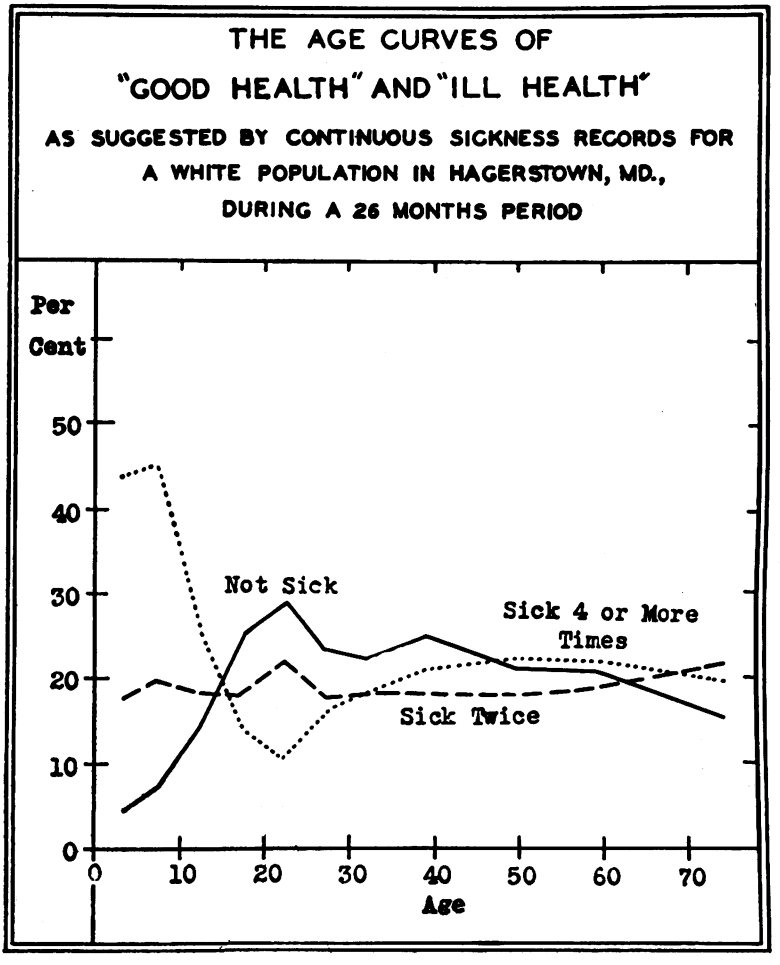
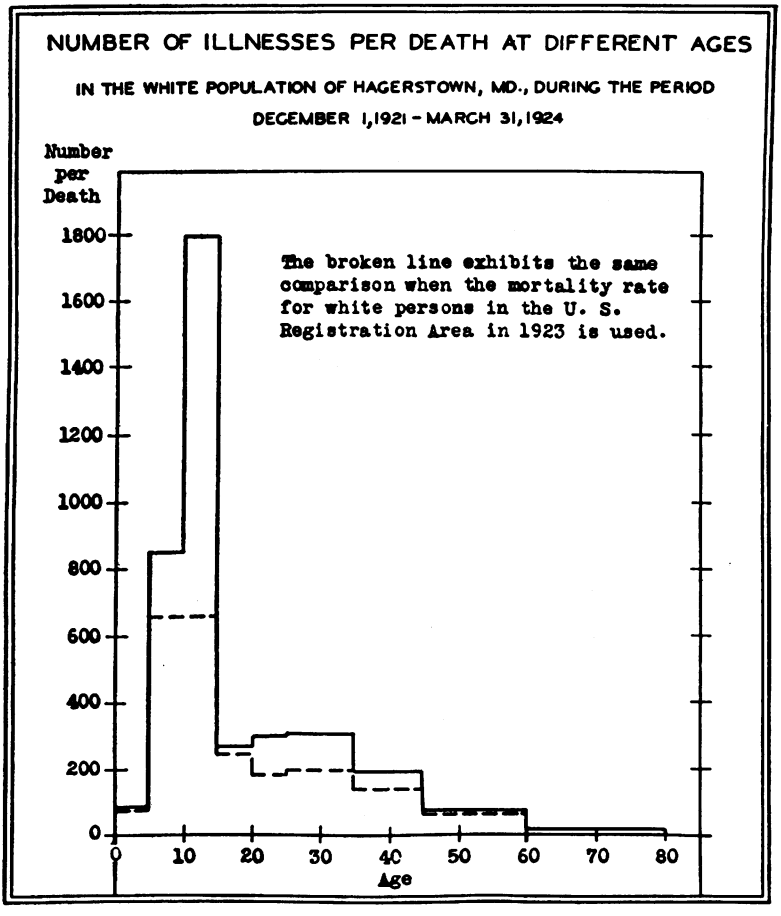

THE AGE CURVES OF
"GOOD HEALTH" AND "ILL HEALTH"
AS SUGGESTED BY CONTINUOUS SICKNESS RECORDS FOR
A WHITE POPULATION IN HAGERSTOWN, MD.,
DURING A 26 MONTHS PERIOD
Per Cent
50
40
30
20
10
0
Not Sick
Sick 4 or More Times
Sick Twice
0
10
20
30
40
50
60
70
Age

TABLE 5

RATIO OF ILLNESSES TO DEATHS AT DIFFERENT AGES

Age, in years	Annual rate per 1,000 of population			Number of illnesses per death		
	Dec. 1, 1921–Mar. 31, 1924		Deaths in registration area of United States in 1923	Illness rate in observed white population in Hagerstown, Md., to death rate in—		Disabling sicknesses to deaths in total membership of Leipzig Sick Fund, 1887–1905
	Illness in an observed group	Deaths in total resident population		White resident population of Hagerstown, Dec. 1, 1921–Mar. 31, 1924	White population of registration area, 1923	
0– 4	1,588	17.56	21.38	90	74	.....
5– 9	1,554	1.83	2.35	850	661	.....
10–14	1,187	.66	1.80	1,798	659	383
15–19	764	2.90	3.10	263	246	129
20–24	712	2.47	3.95	288	180	79
25–34	872	2.89	4.51	304	193	70
35–44	924	4.85	6.70	191	139	52
45–64	991	14.34	16.13	69	61	26
65 and over	1,080	83.08	81.6	13	13	12

FIG. 3


NUMBER OF ILLNESSES PER DEATH AT DIFFERENT AGES
IN THE WHITE POPULATION OF HAGERSTOWN, MD., DURING THE PERIOD
DECEMBER 1,1921 - MARCH 31,1924
Number per Death
1800
1600
1400
1200
1000
800
600
400
200
0
The broken line exhibits the same comparison when the mortality rate for white persons in the U. S. Registration Area in 1923 is used.
0
10
20
30
40
50
60
70
80
Age

older years when not only does his susceptibility to illness increase but also his chances of death. This is due partly, of course, to differences in the nature of the illnesses occurring at these ages and partly to the diminished ability to resist the diseases which manifest themselves in morbidity.

Kinds or "causes" of illness contrasted with mortality.—The picture given by a record of morbidity according to cause (Table 6, Fig. 4)—or, more precisely, according to the *kind* of morbidity

TABLE 6

ILLNESS AND DEATH RATES IN HAGERSTOWN, MD., BY GROUPS OF CAUSES

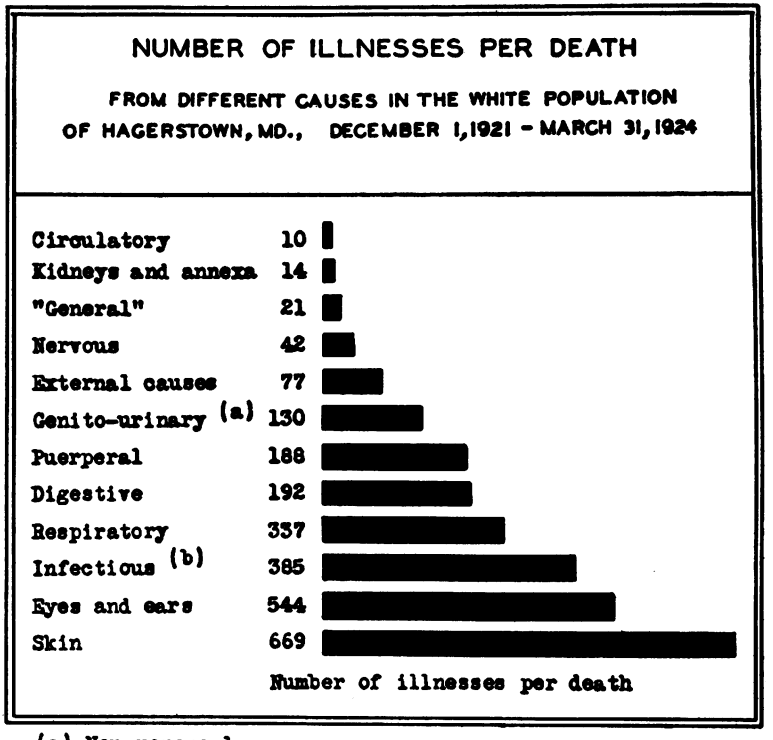
[Based on illness records for approximately 7,000 white persons of all ages, and death records for total white resident population, Dec. 1, 1921–Mar. 31, 1924]

Cause[1]	Annual rate per 1,000		Per cent. distribution, by cause	
	Illnesses	Deaths	Illnesses	Deaths
Diseases of respiratory system (11, 31, 97–107, 109)	672.3	1.995	60.0	19.8
Epidemic, endemic, and infectious (1–42, exc. 11, 31)	88.7	.230	7.9	2.3
General diseases (43–69)	23.1	1.118	2.1	11.1
Diseases of nervous system (70–84; part 205)	48.6	1.118	4.4	11.1
Diseases of eyes and ears (85–86)	23.4	.043	2.1	.4
Diseases of circulatory system (87–96)	24.0	2.410	2.1	23.9
Diseases of digestive system (110–127, 108; part 205)	110.2	.574	9.8	5.7
Diseases of kidneys and annexa (128–134)	14.4	1.062	1.3	10.5
Nonvenereal diseases of genito-urinary system (135–142)	13.0	.100	1.2	1.0
Puerperal conditions (143–150)	24.3	.129	2.2	1.3
Diseases of skin and cellular tissue (151–154; part 205)	19.4	.029	1.7	.3
External causes (165–203)	39.7	.516	3.5	5.1
Other and ill-defined (155–164; part 205)	19.3	.775	1.7	7.7

—is in sharp contrast to that given by mortality. Respiratory diseases and disorders account for 60 per cent. of illness as

[1] Numbers in parentheses refer to those given in the International List of Causes of Death, 1920.

FIG. 4



(a) Non-venereal.
(b) Epidemic, endemic, and infectious.

against about 20 per cent. of deaths; the general group of "epidemic, endemic and infectious" diseases account for 8 per cent. of illnesses, whereas only about 2 per cent. of the deaths were ascribable to this group; digestive diseases and disorders occasioned 10 per cent. of the illnesses as against 6 per cent. of the total mortality. On the other hand, the group of "general" diseases (which includes cancer), the diseases of the nervous and circulatory systems, and the diseases of the kidneys and annexa were relatively much more important causes of mortality than of morbidity. The diseases of the heart and circulatory system show the sharpest contrast; 24 per cent. of deaths are ascribed to these conditions as against only 2 per cent. of illnesses. In other words, these diseases manifest themselves relatively rarely in

definitely morbid effects, although they undoubtedly shorten life and make life less efficient and enjoyable while it lasts.

The prevalence and kinds of "chronic" conditions.—The prevalence of "chronic" conditions, as ascertained by a continuous series of observations upon the Hagerstown group, has a pertinent interest here. For details I shall refer to the accompanying table (Table 7), but some of the more frequent conditions may be mentioned. Of each 1,000 individuals on the average, 34 were affected with arthritis, lumbago and myalgia, 22 with neuralgia, neuritis and sciatica, 22 with neurasthenia, 21 with diseases of the heart, 7 with asthma and hay fever, 10 with chronic indigestion and other intestinal disorders, 10 with appendicitis, 7 with biliary calculi and calculi of the urinary passages, 7 with nephritis and 10 more with other kidney conditions, and so on.

The extent of medical service rendered.—We should not conclude this brief discussion without some consideration of the extent to which preventive, curative and relief activities of public health agencies, the medical profession and hospitals are dealing with the prevalence of disease. So many reports and volumes have been written upon the nature and scope of these activities, that it would be impossible even to summarize the salient facts. I venture to present, however, briefly, the results of a study from an entirely different angle, namely, *the extent to which a fairly typical population is actually the recipient of the services which these activities afford.*

That less than half of the illnesses recorded in the Hagerstown study were attended by physicians (Table 8) may be regarded in one sense as an understatement of the extent of medical services rendered because many of the illnesses recorded were mild cases that ordinarily do not require medical attention. It must be clearly understood, of course, that we are not speaking of "visits," but of *cases*; the number of visits per case was not ascertained, although for an adequate study of medical services it certainly would be a pertinent item for inquiry. Just what cases ought or ought not to have a physician is a question about which opinions will differ, and it was found that the proportion of cases attended varied with their nature (disease), discomfort,

TABLE 7

ILLNESS IN A GENERAL POPULATION GROUP

Prevalence of certain chronic conditions resulting in illnesses during a 28 months' period in a general population group in Hagerstown, Md.

Diseases or conditions (numbers in parentheses refer to those given in the International List of Causes of Death, 1920)	Rate per 1,000 individuals observed		
	Both sexes	Males	Females
Tuberculosis, pulmonary (31)	5.71	3.60	7.69
Tuberculosis, nonpulmonary (33–36)	1.28	.96	1.58
Venereal diseases (38–40)	3.61	1.44	5.65
Cancer (43–49)	2.33	.72	3.85
Tumors, benign (50)	.82	.48	1.13
Rheumatism (51–52)	28.65	20.16	36.64
Lumbago, myalgia, myositis (part of 158)	5.36	5.52	5.20
Rickets (56)	.47	.72	.23
Diabetes (57)	1.40	.48	2.26
Anemia (58)	1.51	.24	2.71
Goiter, exophthalmic (60a)	1.05	.24	1.81
Paralysis (75)	3.14	2.16	4.07
Epilepsy (78)	.93	1.44	.45
Chorea (81)	1.86	.96	2.71
Neuralgia (part of 82)	13.16	6.00	19.91
Neuritis and sciatica (part of 82)	8.62	3.84	13.12
Neurasthenia and nervous exhaustion (part of 84)	22.36	6.72	37.10
Diseases of eye (chronic) (85)	1.63	1.44	1.81
Diseases of the heart (87–90)	21.19	13.68	28.27
Arteriosclerosis (part of 91)	3.38	3.84	2.94
Hemorrhoids (part of 93)	2.10	2.16	2.04
Varicose veins and phlebitis (part of 93)	1.05	.72	1.36
High blood pressure (part of 96)	2.56	1.68	3.39
Asthma and hay fever (105, part of 107)	7.10	6.48	7.69
Ulcers of stomach and duodenum (111)	.93	1.44	.45
Chronic indigestion, constipation, and other stomach or intestinal conditions (112, 114, 119)	9.90	6.96	12.67
Intestinal parasites (116)	2.68	3.36	2.04
Appendicitis (117)	9.90	6.00	13.57
Hernia (118)	2.45	3.36	1.58
Biliary calculi and calculi of the urinary passages (123, 132)	6.64	3.36	9.73
Cholecystitis (part of 124)	2.79	.72	4.75
Unqualified and other liver conditions (part of 124)	3.26	2.16	4.30
Nephritis (acute and chronic) (128, 129)	6.99	6.00	7.92
Unqualified and other kidney conditions (131)	9.78	5.52	13.80
Diseases of bladder (133)	4.77	3.36	6.11
Diseases of male organs (135, 136)	1.40	2.88	.....
Chronic diseases of female genital organs (137–142)	8.15	.....	15.83
Menopause (part of 141)	4.31	.....	8.37
Congenital malformation (159–161)	1.78	1.20	2.27

TABLE 8

THE EXTENT OF MEDICAL AND HOSPITAL SERVICE IN A TYPICAL SMALL CITY

Per cent. of cases of illness, classified by broad groups according to cause, occurring in a white population group in Hagerstown, Md., which received medical and hospital care, Dec. 1, 1921–Mar. 31, 1924

Groups of causes (Numbers in parentheses refer to those in the International List of the Causes of Death, 1920)	Number of illnesses for which information was obtained	Per cent. with specified type of service	
		Attended by physician	In hospital[1]
All diseases	17,217	46	1.34
Diseases of the respiratory system (11, 31, 97–107, 109)[2]	10,461	34	.21
Epidemic, endemic, and infectious diseases (1–42, except 11 and 31)	1,423	61	.77
Other general diseases (43–69)	335	68	5.07
Diseases of nervous system (70–84, part of 205)	686	49	.87
Diseases of eyes and annexa (85)	119	61	.....
Diseases of ears and mastoid process (86)	175	64	5.14
Diseases of circulatory system (87–96)	287	83	1.74
Diseases and disorders of digestive system (110–127, part of 108 and 205)	1,555	58	4.05
Diseases of teeth and gums (part of 108)	118	59	.....
Diseases of kidney and annexa (128–134)	175	87	4.00
Nonvenereal diseases of genito-urinary system (135–142)	180	78	18.89
Confinement and other puerperal conditions (143–150)	390	98	3.59
Diseases of skin and cellular tissue (151–154, part of 205)	278	55	.36
Diseases of bones and organs of locomotion (155–158, part of 205)	103	64	5.83
Congenital malformations and infancy (159–163)	19	89	5.26
Senility (164)	11	64	.....
External causes (165–203)	638	73	1.57
Ill-defined and unknown	137	50	1.46

[1] Hospital cases included in per cent. "Attended by physician."

[2] Excluding 127 tonsillectomies and other operations (nonrespiratory) on throat and nasal fossae.

and severity. Thus, only 34 per cent. of respiratory attacks received medical attention as against over 80 per cent. of illnesses resulting from diseases of the nervous system and of the kidneys. If we omit "colds" and minor digestive disturbances, which numbered about 7,500 of the total cases recorded, we find that 65 per cent. of the remaining cases were attended by physicians.

TABLE 9

MEDICAL AND HOSPITAL SERVICE IN A TYPICAL SMALL CITY

Distribution, according to disease group, of illnesses receiving medical and hospital care in a white population group in Hagerstown, Md., December 1, 1921–March 31, 1924

Diseases (Numbers in parentheses refer to those in the International List of the Causes of Death, 1920)	Per cent. each disease group is of total	
	Attended by physician	In hospital[1]
All diseases	100.0	100.00
Diseases of the respiratory system (11, 31, 97–107, 109)	44.7	9.57
Diseases and disorders of the digestive system (110–127, pts. 108 and 205)	11.3	27.39
Epidemic, endemic, and infectious diseases (1–42, except 11 and 31)	10.9	4.78
External causes (165–203)	5.8	4.35
Confinements and other puerperal conditions (143–150)	4.8	6.09
Diseases of the nervous system (70–84, pt. 205)	4.2	2.61
Diseases of the circulatory system (87–96)	3.0	2.17
Other general diseases (43–69)	2.9	7.39
Diseases of skin and cellular tissue (151–154, pt. 205)	1.9	.43
Diseases of kidney and annexa (128–134)	1.9	3.04
Nonvenereal diseases of the genito-urinary system (135–142)	1.8	14.78
Tonsillectomy, adenoidectomy, and others[2]	1.6	9.57
Diseases of ear and mastoid process (86)	1.4	3.91
Diseases of eyes and annexa (85)	.91	.....
Diseases of teeth and gums (part of 108)	.88	.....
Ill-defined and unknown	.86	.87
Diseases of bones and organs of locomotion (155–158, part of 205)	.....	2.61
Congenital malformation and infancy (159–163)	.....	.43
Senility (164)	.....	.....

[1] Hospital cases included in per cent. "Attended by physician."

[2] Eight other operations on throat and nasal fossae included.

The distribution of the physician's cases according to condition or "cause."—Or, looking at the question of medical services rendered from the point of view of the physician (Table 9), we find that nearly half of the cases attended by physicians in a typical small city were respiratory attacks, 11 per cent. are diseases and disorders of the digestive system, and another 11 per cent. those diseases which are commonly grouped under the general heading "epidemic, endemic and infectious." Two-thirds of the physician's cases fall in these three classes—respiratory, digestive and infectious. About 6 per cent. are cases arising from "external causes," chiefly accidents, 5 per cent. are confinements and conditions incident to childbirth, and 4 per cent. are due to diseases and conditions of the nervous system. These results have been confirmed by the more recent morbidity reports obtained from physicians in a rural area by the New York State Department of Health. From these more extensive data for a half-year period, we may estimate that the average rural practitioner had about 1,020 cases per year (exclusive of communicable diseases) of which 316 were respiratory, 130 digestive disorders, 120 surgical and 47 gynecological, 76 neuroses, 75 tonsilitis, 47 heart diseases, 43 acute rheumatic fever and arthritis, 19 acute and chronic nephritis, 9 venereal, 6 diabetes, and 6 cancer.

Problems Yet Unsolved

It is hardly necessary to make any general observations upon the picture of disease prevalence which has been sketched so roughly, but I would like to reiterate two comments that, however obvious and trite they may be, gather importance as our particular kind of civilization develops.

The first is that public health has as yet barely touched the task of *preventing* the conditions which manifest themselves in physical and mental impairments, in inefficiency and illness, and in postponable death. Plagues and pestilences have been diminished, infant and child mortality from infections and intestinal disorders has been lessened, and healthful living is being established more and more firmly as a popular ideal, but aside from these the prevalence of disease remains as an outstanding problem as yet unsolved.

The second is that under the present organization of medicine this problem of disease prevalence is largely in the domain of private medicine. Speaking as an individual, I am inclined to believe that it ought to continue so if for no other reason that the personal relation between physician and patient is essential to effective medical practice, whether it be curative or preventive. But we can not shun, even if we choose, two exigencies. One is the development of *preventive* practice on the part of the physician if he continues to bear the responsibilities that the prevalence of disease imposes. The other is the economic problems involved, which I leave to Dr. Dublin to discuss.

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